DOCUMENT RESUME

ED 190 659 TM 800 456

AUTHOR Adams, Charles F.; And Others
TITLE Project IMPACT: A Computer Based Instructional Management Information System.
PUB DATE Apr 80
NOTE 54p.; Symposium presented at the Annual Meeting of the American Educational Research Association (64th, Boston, MA, April 7-11, 1980).

EDRS PRICE MF01/PC03 Plus Postage.
DESCRIPTORS *Computer Managed Instruction; Criterion Referenced Tests; Curriculum; *Data Bases; Diagnostic Teaching; Elementary Secondary Education; Evaluation Needs; *Formative Evaluation; Intermediate Administrative Units; Norm Referenced Tests; *Program Development; *Program Implementation; Reading Achievement; Scoring; *State Programs; Student Records; Teacher Attitudes
IDENTIFIERS New York; *Project IMPACT

ABSTRACT

IMPACT is a computer-based information system designed to help school districts share materials and expertise and to implement state-mandated evaluation of student achievement. It is designed to meet local, regional, and state evaluation and reporting requirements. Based upon the diagnostic-prescriptive approach to instruction, it consists of: (1) a master curriculum file containing thousands of instructional objectives, test items, and teaching activities for reading, mathematics and special education; (2) a computer program for scoring and interpreting standardized norm-referenced tests; (3) a computer program for scoring and interpreting locally developed criterion referenced tests; and (4) a student achievement history file for recording scores, objectives mastered, prescriptions assigned, and demographic data. The master curriculum file and criterion-referenced scoring program were pilot tested at six grade levels. Although teachers developed over 1,200 reading activities for the curriculum file, they used only 30% in the pilot classrooms. After six months, students in the pilot project mastered 69% of the activities, 1% below the predetermined level. Teachers were pleased with the quick turnaround time for scoring. (Frank Ambrosie, James Craner, Steve Kidder, and Charles Adams contributed the four papers in this symposium.) (CP)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

U S DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

ED190659

PROJECT IMPACT: A COMPUTER BASED INSTRUCTIONAL MANAGEMENT INFORMATION SYSTEM

PAPER PRESENTATION

SIG/SYSTEMS RESEARCH

AT

AERA ANNUAL CONFERENCE

BOSTON, MASSACHUSETTS

APRIL, 1980

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY
C. Adams
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

PRESENTORS:
CHARLES F. ADAMS, CHAIRMAN
FRANK AMBROSIE
JAMES CRANER
STEVEN KIDDER
ROBERT O'REILLY, REACTOR

TM 800 456

PLANNING AND DESIGN OF A COMPUTER BASED INSTRUCTIONAL MANAGEMENT INFORMATION SYSTEM

by

Frank Ambrosie
Onondaga Madison BOCES
Syracuse, New York

Prepared for
Paper Presentation
on
SIG/System Research

Conducted by
American Educational Research Association
Boston, Massachusettes

April 11, 1980

Introduction

For the last ten years there have been a number of projects and systems developed to provide some form of computer based support for instructional decision making. Systems such as the Wisconsin System for Instructional Management (WIS-SIM) TRACER from CTB/McGraw-Hill, Computer Based Resource Units (CBRU), and Comprehensive Achievement Monitoring (CAM) widely used in this state are examples of previous efforts that have had some success and acceptance as computer based instructional support systems (Bozeman, 1979, p. 117-137). However, none of the systems refered to, as well as others reviewed but not mentioned, provide a comprehensive support system that covers all the major aspects of pupil and program decision making. Also, as stand-alone systems, they do not easily fit into the New York State School Computer Services System, thus requiring extra effort on the part of school district personnel to use them (i.e., enter and maintain redundant student information).

The increasing need and in some cases, demand for more detailed evaluation information by many segments of the community, both within and without the educational establishment, has placed great burdens upon school administrators and teachers. More precise and frequent testing of student achievement, maintaining student achievement records, and developing individual and aggregate reports require much time and effort if they are to be sufficient for pupil and program decision making.

What a management system should provide is output data which will facilitate an efficient means of monitoring student progress toward the

achievement of program objectives, summarizing such data for use by students, teachers, curriculum supervisors and administrators in a way that will support decisions and be flexible enough to be tailored to the information needs of the local school district. Thus, the need for support systems that will reduce the time and manpower devoted to essentially clerical record keeping and report preparation remains a top priority. But IMPACT was meant to be more.

Identifying the Early Problem

The regional education computer centers of New York State were providing local district clients with a standardized test scoring service. Local school districts in the Central (Syracuse) New York region were concerned that although their current needs were being met with conventional output reports, the service in no way addressed foreboding future data trends.

The concern for future data needs which would serve the dual purpose of meeting State and Federal reporting requirements as well as providing valid information for local district use in program decision making resulted in a series of information exchange meetings among Central New York school personnel. Data processing staff, building administrators and program specialists participated in the meetings. Discussions focused on a myriad of issues. The magnitude of the comprehensive reporting system which was being discussed including development, financing and implementation became readily apparent to the early planning group. It was decided that the proposed project would be a cooperative venture incorporating the concept of involvement by the total state school system. All educational agencies state, regional and local,

including the private education sector would play a role. It was also agreed that a developmental project of this proportion could not be financed with local monies and when completed would possess statewide utility. A system of organizational governance was also needed for managing the project and to facilitate reporting.

Intermediate Unit Influence. Members of three Boards of Cooperative Educational Service agencies (New York State's version of the Intermediate Unit) met in a series of final planning meetings to focus on how to approach the State Education Department to convince them of the need for a comprehensive student information system which would benefit the entire educational system of the state. Serving the information needs at the local, regional and state levels through the use of a single comprehensive system was the major task confronting this group of BOCES planners.

The New York State Education Department revised its Planning Division in 1976 relative to the distribution of Title III ESEA funding. Monies formerly awarded for exemplorary projects which promised innovative educational programming would be awarded in the future under four general functional areas of Development, Validation, Demonstration and Replication. New projects competed for developmental funds. Upon completion, a developmental project would be validated through a process established and carried out by the State Education Department. Demonstration by the developer organization and replication by an adopter organization completed the program development, dissemination, and implementation model sequence.

Influences of IV-C. New guidelines were distributed to the school districts of the state and entitled Title IV-C, ESEA. A writing team

was appointed to complete and submit a developmental proposal complying with the new guidelines. The proposal represented a unique Title IV-C effort in that the planning, writing, and submission of the proposal resulted from cooperation at a multi-BOCES level (Cayuga-Onondaga BOCES, Onondaga-Madison BOCES, and Tompkins-Seneca-Tioga BOCES). The decision to participate in the joint venture was based upon successful implementation of previous regional efforts. Among those were the Central New York Region Diagnostic/Prescriptive Support Services (L.E.A. Tompkins-Seneca-Tioga BOCES), the Project Mainstream (L.E.A. City School District, Yonkers, New York), the Elementary Inservice Project (L.E.A. Cortland-Madison BOCES), and the NYSSCSS Student Subsystem (Central New York Region Data Processing Center and Broome-Delaware Tioga Data Processing Center). Each of these projects demonstrated the viability and effectiveness of interdistrict sharing relative to problem solving, programmatic design, and evaluation processes. In line with this philosophy, the Team of the Central New York Region welcomed Title IV-C because it had the potential to provide needed support at the State Education Department level for designing and implementing cooperative comprehensive models for meeting common needs as well as sharing successes throughout the state.

The need for the cooperative program was endorsed at the regional level by a Joint Management Team (JMT) which included membership from the Cayuga-Onondaga BOCES, the Cortland-Madison BOCES, the Onondaga-Madison BOCES, the Oswego BOCES, and the Tompkins-Seneca-Tioga BOCES. Included also were the City of Syracuse and the nonpublic school district sector.

Project IMPACT

The major problem addressed by project IMPACT was to provide a computer based student achievement information system that could be easily used by local school district personnel to provide decision relevant information in a timely fashion. The need expressed itself in the following ways:

1. Between 20% and 30% of all pupils within the Central New York region suffered marked discrepancies between ability and achievement in terms of skill acquisition in the area of reading.

2. School districts were required to provide mandated State Education Department evaluation reports for categorically aided student populations.

3. Individual districts were making isolated efforts to assist the "underachiever" in reading without any substantial sharing of materials, expertise, and/or techniques, designed to overcome identified deficits.

4. In treating the "underachiever" in reading, classroom teachers were demanding prescriptive methods, techniques, and resources which related directly to program treatment.

5. School districts wished to synthesize, document, and share within its own unit and with other districts the most promising of its educational practices and required a vehicle for the communication of these materials, techniques, methods.

6. School districts were experiencing difficulty in complying with state-level regulations regarding the time-consuming and often complex documentation of the processes and products utilized for the selection, treatment, and assessment of students. If, at various regional levels, student data could be collected in a uniform and standard manner and then organized and submitted to the State Education Department, better planning and more timely decision making could occur at the state, regional, and local levels.

7. To comply effectively with State Education Commissioner's and State Education Department regulations, districts had to provide for staff orientation to present and future legislation and regulations, training with processes and materials which relate to regulations, and follow-up procedures relative to regulations.

The overall goal of the IMPACT effort was to design a cooperative model for effectively linking individual school districts with each other and with the State Education Department meeting local program needs and implementing mandated planning requirements through the development and pilot testing of the components illustrated in Figure 1.

The Prescriptive Activities in Reading (PAR) component development was assigned to the Cayuga BOCES. Teams of teachers from a number of school districts were organized and given the responsibility to develop a bank of reading prescriptions. This work was accomplished primarily during the summer months.

The task of developing the data automated student information delivery system was directed to the Onondaga-Madison BOCES. Since the Central New York Regional Data Processing Center was located in that BOCES, its LEA function in the overall IMPACT Project was predetermined. The Center had previously been designated (1973) by the State Education Department to develop the Statewide Student System encompassing such basic applications as census, attendance, and report cards all operating off of a common data base manager.

Finally, the Thompkins BOCES was assigned the responsibility for organizing five building level teams within the Central New York area for implementing the finished products of IMPACT. Schools were chosen from districts of varying size to provide a wide range of experiences in the pilot project. Training materials were also developed for use by building level administrative and teaching personnel.

Governance of IMPACT. Managing Project IMPACT at the state, regional and local levels dictated that an organizational structure be developed to accommodate continuous communication and progress reporting. A governance system (Figure 2) of this magnitude required that the logistics of the network could be developed, accepted and managed at all three levels.

IMPACT created a problem for the State Education Department as it forced three divisions within the Department to pull their collective efforts in a single Title IV-C project. No other proposal submitted under the IV-C guidelines competed for multi divisional monies under the guise of a single developmental project. A State Department Monitoring Team was established, the first of its kind under IV-C. The five BOCES of the Central New York Region also established a Superintendent Advisory Committee serving the needs of the region. And finally a users Advisory Committee was established whose major function was to specify the basic elements of the IMPACT system. User needs were translated into the development of the data automated system that would support instructional decision making at the local district level.

The key to the performance of the governance system was the assigning of a single monitoring manager as liaison. This individual served on all committees and managed all committee activity. The monitoring mamager was also responsible for coordinating the PAR, IMPACT and SIS team developmental effort.

Figure 1

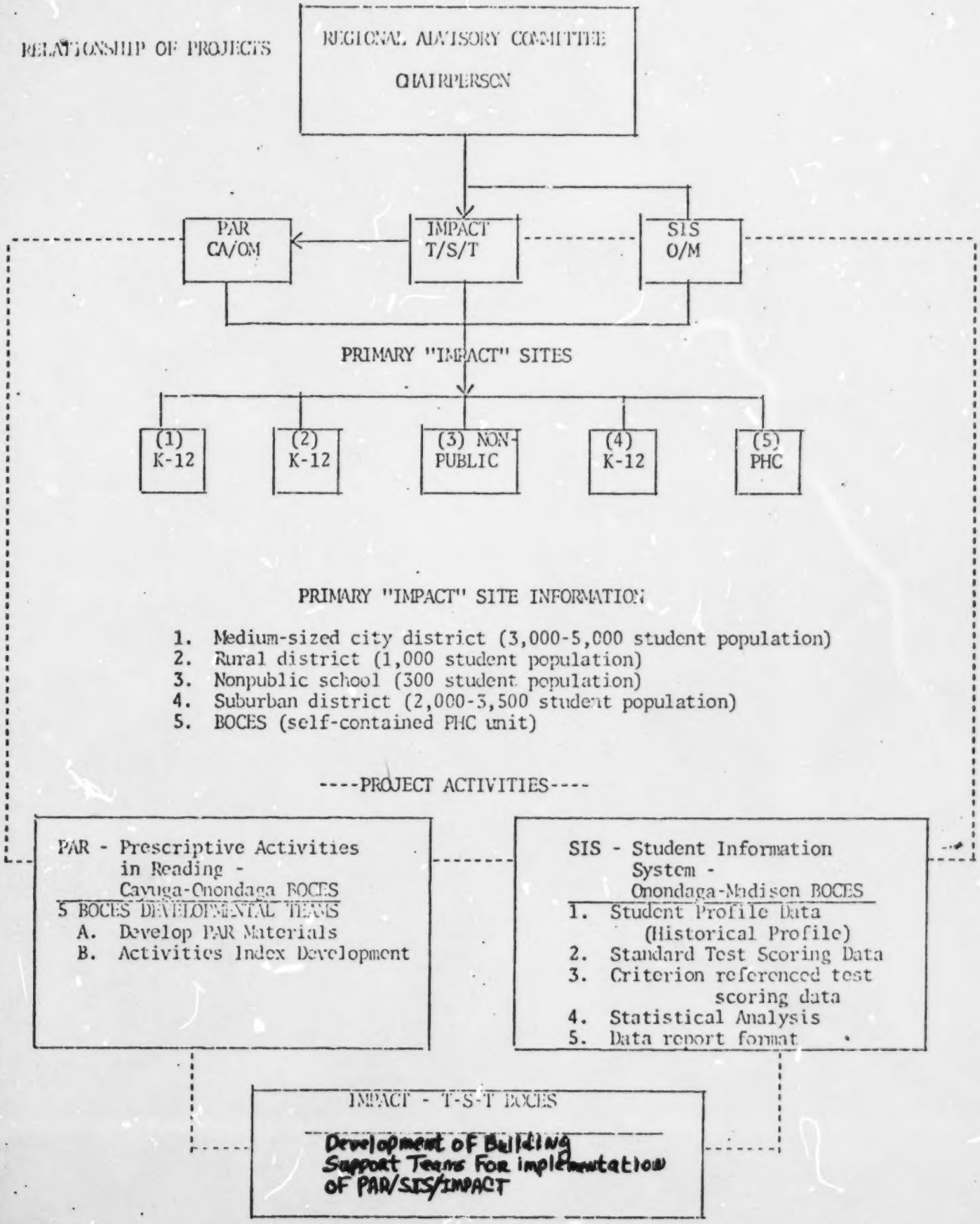
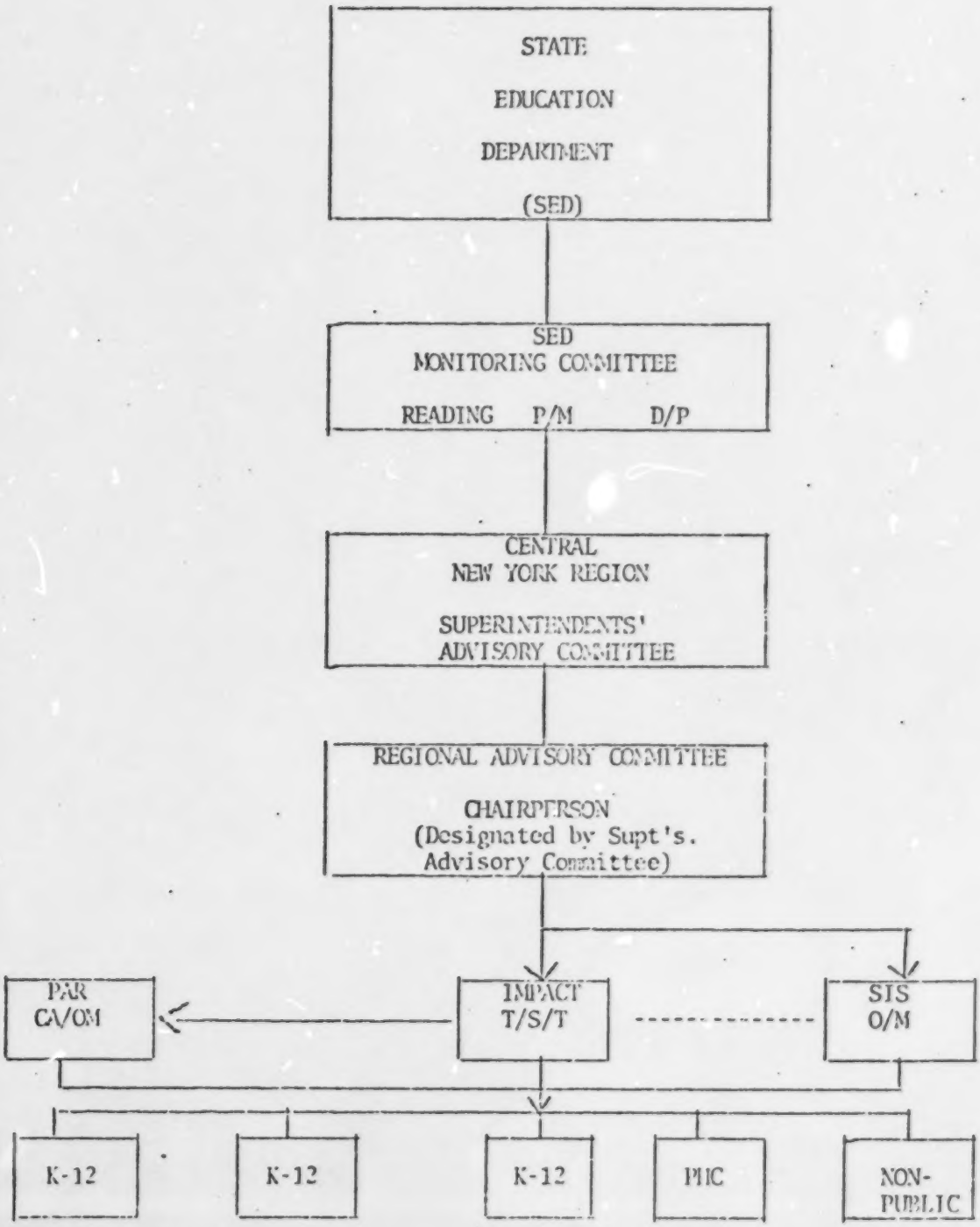

RELATIONSHIP OF PROJECTS
REGIONAL ADVISORY COMMITTEE
CHAIRPERSON
PAR
CA/OM
IMPACT
T/S/T
SIS
O/M
PRIMARY "IMPACT" SITES
(1)
K-12
(2)
K-12
(3) NON-
PUBLIC
(4)
K-12
(5)
PHC
PRIMARY "IMPACT" SITE INFORMATION
1. Medium-sized city district (3,000-5,000 student population)
2. Rural district (1,000 student population)
3. Nonpublic school (300 student population)
4. Suburban district (2,000-3,500 student population)
5. BOCES (self-contained PHC unit)
----PROJECT ACTIVITIES----
PAR - Prescriptive Activities in Reading - Cayuga-Onondaga BOCES
5 BOCES DEVELOPMENTAL TEAMS
A. Develop PAR Materials
B. Activities Index Development
SIS - Student Information System - Onondaga-Madison BOCES
1. Student Profile Data (Historical Profile)
2. Standard Test Scoring Data
3. Criterion referenced test scoring data
4. Statistical Analysis
5. Data report format
IMPACT - T-S-T BOCES
Development of Building Support Teams For implementation OF PAR/SIS/IMPACT

Figure 2

ORGANIZATIONAL CHART FOR IMPACT
showing
RELATIONSHIP TO MULTI-BOCES PROPOSAL



PRIMARY "IMPACT" SITES

Conclusion

The project has just completed its fourth year of operation on developing a computer based student achievement information system. The basic elements or components of the computer based student achievement information system are based upon the theory of systematic structure for curriculum design and instructional management which is often referred to as the diagnostic/prescriptive approach to instruction. The four components of the system being developed are 1) a Master Curriculum File containing instructional objectives, perscriptions and measurement items, 2) a Norm Referenced Test Scoring and Analysis Module which can score and report results of most of the popular standardized commercial tests, 3) a Criterion Referenced Test Scoring and Analysis Module which will score and report results of locally developed CRT's and maintain progress records for each student, objective by objective, and provide group summary data by locally determined groups of students, 4) a Student Achievement Historical File designed as a permanent record for each student enrolled in a program using the system including both norm referenced and criterion referenced scores, objectives mastered, prescriptions assigned as well as certain demographic data.

A major portion of the first year of the project was devoted to planning and designing the system. The results of that design effort led to the structuring of the system into the four components or modules described above.

There was an early reluctance among potential client groups within

the state to become involved in IMPACT activities. This reservation was accentuated by the lack of response by various populations, BOCES Superintendents, data processing personnel, and local district personnel to scheduled presentations relating to IMPACT and its management potential. Early anonymity has recently changed to current Project IMPACT noterity. Current requirements established by the New York State Education Department relative to Regents Competency Testing, Reregistration of High Schools, Reporting on students with handicapping conditions and a system for reallocating resources at the building level have made it abundantly clear to the entire state education system that managing student information requires a high priority today.

PROJECT IMPACT - HOW IT FUNCTIONS

BY

James Craner

Onondaga-Madison Board of Cooperative Educational Services

Syracuse, New York

Prepared for

Project IMPACT: A Computer Based Instructional

Management Information System

a

SIG on Systems Research

at the

American Educational Research Association Annual Conference

Boston, Massachusetts

April 11, 1980

I. OVERVIEW

The IMPACT system is a support system for the administrative and instructional staff in a school. It places the advantages of technology, speed and cost effectiveness, at the disposal of all educators in New York State.

The system has been under design and pilot testing by the staff of the Onondaga-Madison BOCES for over three years, supported by an Elementary and Secondary Education Act Title IV-C grant. The various components have been field tested by over 70 school districts in various parts of Central New York as of 1979.

IMPACT is a series of computer programs and a large storage bank of data to assist local school personnel in the following tasks:

A. Local course curriculum development

B. Standardized achievement testing

C. Criterion referenced testing

D. Student achievement data analysis

E. Long term storage and retrieval of student test data

F. Identification and reporting of students in categorically aided programs as well as those students in need of remediation as indicated by the administration of NYS required tests

G. Pupil Achievement Assessment

H. Program Assessment

The IMPACT system is divided into four major components each making its own contribution to the data storage and analysis needs of a variety of users in the eudcation community. These components are:

1. <u>The Master Curriculum File</u> - A library of instructional objectives, criterion referenced measurement items, and teaching-learning activities refered to as presecriptions.

2. The Norm Referenced Test Scoring Component - A series of computer programs designed to score any of the various standardized tests or New York State Education Department tests currently in use in the field and provide a variety of analysis reports to school personnel

3. The Criterion Referenced Test Scoring Component - A series of computer programs designed to assist school personnel in the development and monitoring of criterion referenced instructional courses, including the periodic assessment of student achievement and summary data for program assessment.

4. The Student Achievement Historical File Component - Stores the variety of student achievement information accumulated by a student during his/her school career. This data is then readily available for a variety of purposes by school personnel. Perhaps the most frequent use of the history file and its related computer programs could be the creation of records required by the State Education Department for children in categorically aided federal programs. However, such history data can be used for longitudinal research and evaluation purposes as well.

IMPACT has been designed to operate hand-in-hand with the New York School Computer Services System student subsystem installed in several of the Board of Cooperative Educational Services Regional Computer Centers in New York. The student demographic, and related data, required by many of the IMPACT system programs is stored in the files of the New York State School Computer Services System and available for use in the IMPACT system when required. The norm referenced testing component and the master curriculum file, however, may operate as stand alone components.

Each of the sections which follows describes one of the four components of the IMPACT system in greater detail.

II. THE MASTER CURRICULUM FILE COMPONENT

The Master Curriculum File (MCF) stores the elements needed to build and evaluate a local course curriculum. These are instructional objectives, measurement items, and teaching strategies. The user may retrieve these elements either in the form of printed copy or by the use of terminal equipment directly accessing the files.

In addition to its use as a curriculum library, the Master Curriculum File serves as a tool of the curriculum evaluator. Contained in the banks of the Master Curriculum File are records of the use of each curriculum element and data relating to the effectiveness of that use. Thus, the curriculum evaluator can ascertain whether the use of an objective, measurement item, or teaching activity is having a positive effect on the student population.

The Master Curriculum File may be used by district personnel either by itself or in conjunction with the Criterion Test Scoring (CRT) component to be discussed in a later section. If the user intendes to monitor a curricular area with the Criterion Referenced Test Scoring component, the user first determines whether all the necessary objectives, measurement items,

and teaching activities are stored in the Master Curriculum File. The IMPACT system allows the user district almost total flexibility in the selection and/or storage of curricular elements in the Master Curriculum File. The IMPACT system allows the user district almost total flexibility in the selection and/or storage of curricular elements in the Master Curriculum File for later use by the district in the creation of criterion referenced instructional courses.

The following is an example of an instructional objective contained in the IMPACT Master Curriculum File. The hardcopy version of a curricular element is available either on stock narrow computer paper, 5 x 8 index card, pre-punched notebook sized paper or on microfiche. All relevant codes pertaining to the objective appear along with the counters indicating the number of students who have been assigned the objective and the number of students who have been successful in mastering it.

MASTER CURRICULUM FILE INQUIRY - OBJECTIVE

```
Area-3000       Reading

Objective Number  05440203          Main - Subordinate ideas
      Concept - 05440
    Inst. Lvl - 02
     Obj Seq  - 03

Stimulus -        03                Number Taught - 000215
Response -        05                Number Mastered - 000162
Status            Active

Line                                Line Text

01 Given a selection and given the main idea(s) of the selection,
02 Student designates the subordinate idea(s) for the main idea
```

At present the Master Curriculum File contains approximately the following number of curricular elements:

Curricular Area	Objectives	Test Items	Teaching Activities
Reading	6,900	5,600	3,400
Mathematics	2,200	4,500	0
Special Education	3,500	0	100

A user district would find all necessary objectives, test items, and in some cases teaching activities necessary to build complete instructional courses in the following areas:

A. Mathematics K-6

B. 9th grade algebra course based on the recommended New York State Curriculum Guide

C. 9th Grade general math course based on the recommended New York State Curriculum Guide and leading to the successful completion of the Regents Competency Test

D. Reading K-12 including reading in the content areas

E. Special Education -- Objectives currently availabe are in the self help area and are used in the creation of Individual Education Plans.

During the upcoming year (January 1980-81), the Master Curriculum File is expected to be expanded to include most or all of the following elements:

A. Evaluation items for the special education objectives. These items are called task analyses by those Special Education personnel who use them. Approximately 100 of these task analysis statements now exist in the files.

B. CLOZE type passages from the State Education Department test development notebook (TDN). These passages will be available

for use in creating remedial courses of instruction for students identified as deficient in reading skills by administration of the New York State degrees of reading power test (DRP) in 6th grade.

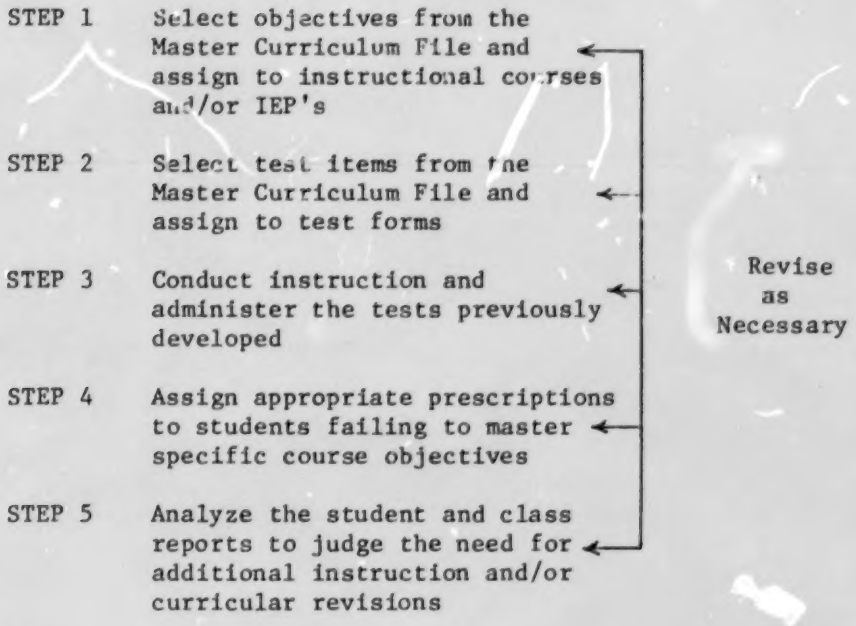
Detailed information regarding the coding structure of the IMPACT Master Curriculum File as well as the selection of elements in the file is available in the complete IMPACT User Manual available from the IMPACT staff.

III. THE CRITERION REFERENCED INSTRUCTIONAL COMPONENT

The Criterion Referenced Instructional Component provides the user district with the capability of setting up and monitoring instructional courses with the assistance of computer technology. That is, the course is structured by the use of specific instructional objectives with presecription for learning activities assigned to each objective and criterion referenced modules used to assess student progress in mastering the objectives.

At the same time that instruction is taking place and monitoring tests are being administered, the computer files are storing data related to the effectiveness of the instruction and the appropriateness of the curricular objectives, measurement items, and teaching activities. The data thus generated and stored is used periodically in the course of decision making related to student instructional strategies and curricular revision.

The IMPACT system allows such courses to be set up on a regional, district, school, grade, or even classroom level depending on the needs of the user groups. The steps following are those followed in the course creation and monitoring process.


STEP 1
Select objectives from the Master Curriculum File and assign to instructional courses and/or IEP's
STEP 2
Select test items from the Master Curriculum File and assign to test forms
STEP 3
Conduct instruction and administer the tests previously developed
STEP 4
Assign appropriate prescriptions to students failing to master specific course objectives
STEP 5
Analyze the student and class reports to judge the need for additional instruction and/or curricular revisions
Revise as Necessary

The CRT component of Project IMPACT generates a number of output reports which are used for various purposes in the monitoring/revision process. These reports are provided in hard copy, for the most part, although one of them, the student record display is available to those users who have terminal equipment installed in their districts.

A brief description of the output reports follows, with an indication of the points in time when each might be requested and the uses to which they are typically put in the educational decision making process.

A. Reports following the administration of each CRT test:

Student Report - Used for reporting each student's performance on a single test. The report indicates objectives mastered and not, as well as any prescriptions which may have been assigned.

Matrix Report(s) - Serves as a summary for the teacher of the information contained in the student reports plus a record of each student's response patterns on the CRT test just administered.

Class Diagnostic - Places the students into instructional groups according to the objectives not mastered and indicates which teaching activities have been assigned to each group.

Form Analysis - Serves as a preliminary indicator of the quality of the test form used to measure the objectives tested by the CRT just administered. It contains an analysis of the student response patterns to each item on the test form.

B. Reports requested at intervals during the school year

Group Summary - Summarizes the performance of a group of students by course objective in percentage terms. A group is defined by the user and may be at the region, district, school course, teacher, or class level.

Individual Student Record Display - A year to date summary of an individual student's progress on the objectives assigned for the course or on an IEP. This report is also available on-line via terminal access.

Curriculum Analysis - A year to date record of the number of students mastering each course objective in pre and post instructional modalities. The same report gives a profile of the effectiveness of each test question and teaching activity used in conjunction with each instructional objective.

The current school year, 1979-80, is the first one for full pilot testing of this component of the system. Complete data on a full year of operation are not yet available to provide the formative assessment necessary to determine its instructional effectiveness.

IV. THE NORM REFERENCED TESTING COMPONENT

The Norm Referenced Test Scoring Component (NRT) of IMPACT was the first component of the system developed. It has been used to score the tests submitted by the 50 districts in the Onondaga-Madison BOCES service area for the past three years. The NRT component may be employed in conjunction with the New York State School Computer Services System student subsystem or it may operate as a stand alone. The IMPACT staff believe that the NRT component is substantially superior to the commercial test scoring packages in use by most of the regional centers and school districts in terms of operating ease and efficiency.

The following characteristics of the Norm Referenced Test Scoring component are of particular benefit to the user:

A. Answer sheets developed for the system can be pre-printed with student identification information. This substantially reduces the number of errors frequently accompanying idendification of answer documents by students. This pre-printing of answer sheets reduces test administration time and eases distribution of test materials as well.

B. When used in conjunction with the New York State School Computer Services System student subsystem, the student information resident in the student files is used for both pre-printing and later processing. This eliminates the need for a creation of a student file at the time of testing.

C. The output records can be stored off-line on magnetic tape or they may be stored in the student achievement historical file for easier retrieval in the generation of additional output reports later in the school year.

D. The types of analysis output reports available in the system provide student achievement data in formats that enable them to be used more effectively by instructional personnel than were the more traditional reports provided by other popular scoring systems.

The following output reports are available to the user from the programs in the NRT component:

A. Student list of all scores, both raw and derived, available for the test

B. Group stanine analysis summary

C. Sort score student list to identify pupils falling above or below a reference score point

D. Gummed labels for permanent folder record keeping

E. District and school statistics including distributions for the completion of New York State reporting after the administration of state tests.

F. Analysis reports specifically designed to meet the requirements of the United States Office of Education Models A, B and C for reporting the evaluation of ESEA Title I programs.

G. Punches card output of scores for loading into another data processing system

H. Individual student record cards for mailing of test scores to parents

I. Group and/or individual item analysis reports for use in skill remediation

V. THE STUDENT ACHIEVEMENT HISTORICAL FILE COMPONENT

The Student Achievement Historical File (SAHF) was the last component of Project IMPACT to be developed. While it presently has some operational capability, it's development will not be completed until the end of this school year. Its first major test will be its ability to facilitate the year end data reporting required by the New York State Education Department.

The SAHF is being designed and developed as a storehouse for achievement test data generated by both the NRT and CRT components of the IMPACT system. At the present time attention is being given to the long term storage of the data output from the NRT component. Particular attention is being given to the possibility of combining the data in the IMPACT NRT test scoring files with the student data contained in the NYSSCSS student information files. This combination of data would then be used for transcripting and reporting to various state agencies in much the same fashion that occupational education and general education attendance data is now reported.

While the SAHF will have the capability of generating reports in hard copy, one of its design specifications is its use as an on-line file as well. With this capability, it provides the user in the school district with quick access to achievement records as soon as the tests are processed by the local computer center. This quick access makes test records more readily available and thus their meaningful use in the decision making processes of guidance counselors, building administrators, and committees on the handicapped is enhanced.

The SAHF will also permit the user to create test records on-line and store these in the file for later use. This capability will allow the late administration of norm referenced tests to new entrants and those students

whose performance indicates that a retest is necessary. While the user will always have the option of submitting such tests through the NRT component as usual, the ability to create test records on-line will speed up the overall tasks when only a small number of students are involved.

Project IMPACT--A Basis for Enhancing Program Decision-Making

Steven J. Kidder
State Education Department
Albany, New York

Meeting performance standards is the name of the game in New York State. In fact, it is quite possible that New York now has the highest graduation standards in the nation. How will New York's performance standards, related guidelines, and regulations affect testing and evaluation activities at the local, regional, and State levels? Will Project IMPACT meet testing and evaluation needs brought about by the State's emphasis on performance standards and competency tests?

Although some of the Department's student performance standards and related regulations are tentative, three major areas of concern are--

1. Competence in reading comprehension, writing, and mathematics must be demonstrated on either the Regents examinations or the Regents competency tests before a high school diploma will be awarded.
2. Remedial instruction must be given to pupils in grades 3 and 6 who score below the Statewide Reference Points on the PEP tests, to pupils in grades 8 or 9 who fail a preliminary competency test, and to any high school student who fails a Regents Competency Test.
3. In order to be registered, a high school will have to demonstrate that 85% of its seniors have successfully completed the competency

requirements for receipt of a diploma. Final Statewide registration standards will be established by the Regents and could include standards based on Preliminary Competency Tests, rates of pupil achievement, Regents examinations, and quality of educational practices.

These regulations are already being felt at the local level. Educators understand the importance of these regulations, but they are not certain how they might best respond to them within very tight budgets. Attempts to prevent pupils from failing and to remediate pupils who do fail competency tests will take time, planning, and money. These problems plus new registration standards present serious challenges to local educators in New York State.

There is little question in the minds of Department staff that efforts to improve instruction and evaluation statewide are doomed to failure unless all parties with vested interests continually build up an awareness of the need to support instruction and evaluation activities in new and, where possible, more efficient ways. Awareness of this need to improve instruction and evaluation is being nurtured locally, regionally, and in the Department. While this kind of awarenes could be imposed, as we have seen in the regulations concerning statewide reference points in the basic skills and high school registration requirements, at this time the Department is taking a developmental[1] rather than regulatory stance. However, both types of incentives for change are undoubtedly needed, especially in states as large and diverse as New York. As awareness of instructional and evaluation

[1]Developmental being defined as assisting in the development of local capability to solve local problems and to manage educational resources effectively.

needs grows, projects like IMPACT will find greater acceptance.

It seems reasonable, then, to ask how the Department will help regional and local educators solve problems brought about by these new standards and regulations.

Fortunately, the Department is not insensitive to these problems brought about by these recent regulations. In fact, it is working along many avenues to assist in their resolution. The main avenues of assistance include: (1) the Resource Allocation Plan, a new way of meeting achievement-related problems in schools; (2) high school registration; (3) de-centralization of evaluation activities (especially those activities related to ESEA Title I); (4) new concerns for the efficient use of computer capabilities through distributed data processing; (5) an Evaluation Specialist Program to assist with regional and local evaluation issues; (6) a project to develop a software package to improve the use of ESEA Title I evaluation data locally; and (7) a growing concern for full use of computers to help manage instruction and evaluation at the regional and local level--IMPACT being a prime prototype of this concern.

Specifically, the Department has always been interested in streamlining and improving evaluation and reporting systems used throughout the state. Figure 1 schematizes these specific interests as they were five years ago, as they are now, and as they will be in the near future. By varying the size of each circle, the figure illustrates the relative importance the Department places on evaluation and reporting activities for the Federal government, the Department per se, regional computing facilities, and local school

districts. The small arrows on the Figure represent the transmittal of data from one level or institution to the next level, and the large arrows represent the delivery of reports from one level to the next. Thus, the State produces reports for the Federal level, the regional level produces reports for local consumption, and some local districts have their own report generating capability.

Figure I summarizes the following trends:

1. emphasis on evaluation activities for Federal and State purposes is decreasing;
2. emphasis on regional evaluation activities has been steady but will grow;
3. emphasis on local evaluation activities, especially those supporting instruction, is steadily increasing;
4. emphasis or use of locally developed evaluation and reporting systems in support of instruction is growing steadily.

The IMPACT Project is quite unique because it is being designed to meet local, regional, and State evaluation and reporting requirements. A prime example of this uniqueness is IMPACT's new module produces reports that can be used for local evaluation purposes and also produces magnetic tapes with Title I evaluation data that meet State reporting requirements. The development of this module is directly related to the Department's effort to place the responsibility for collecting, editing, and analyzing Title I evaluation data at the regional level. Projects like IMPACT will fare well

as the Department begins to decentralize Title I evaluation and reporting activities. IMPACT will also be interfacing with and/or facilitating the development of local capabilities. It is critical that Project IMPACT be capable of dealing with the complexities suggested by Figure I. Its development should also focus heavily on three systems characteristics often neglected in complex R&D efforts like this, namely,

* technical assistance and support to insure the use of high-quality (valid, reliable), meaningful data-collection instruments;
* provision for determining the accuracy and reliability of all data accepted for analysis and report generation and subsequent modification of assessment instruments not meeting technical standards;
* capability of generating timely, highly meaningful reports to teachers, principals, project managers, school boards, parents, and other appropriate audiences when necessary.

Although this brief discussion of Statewide evaluation and reporting policies has raised many issues, it is clear that Project IMPACT meets many of the needs reflected in Departmental policies. We look forward with anticipation to its continued development and migration throughout New York State.

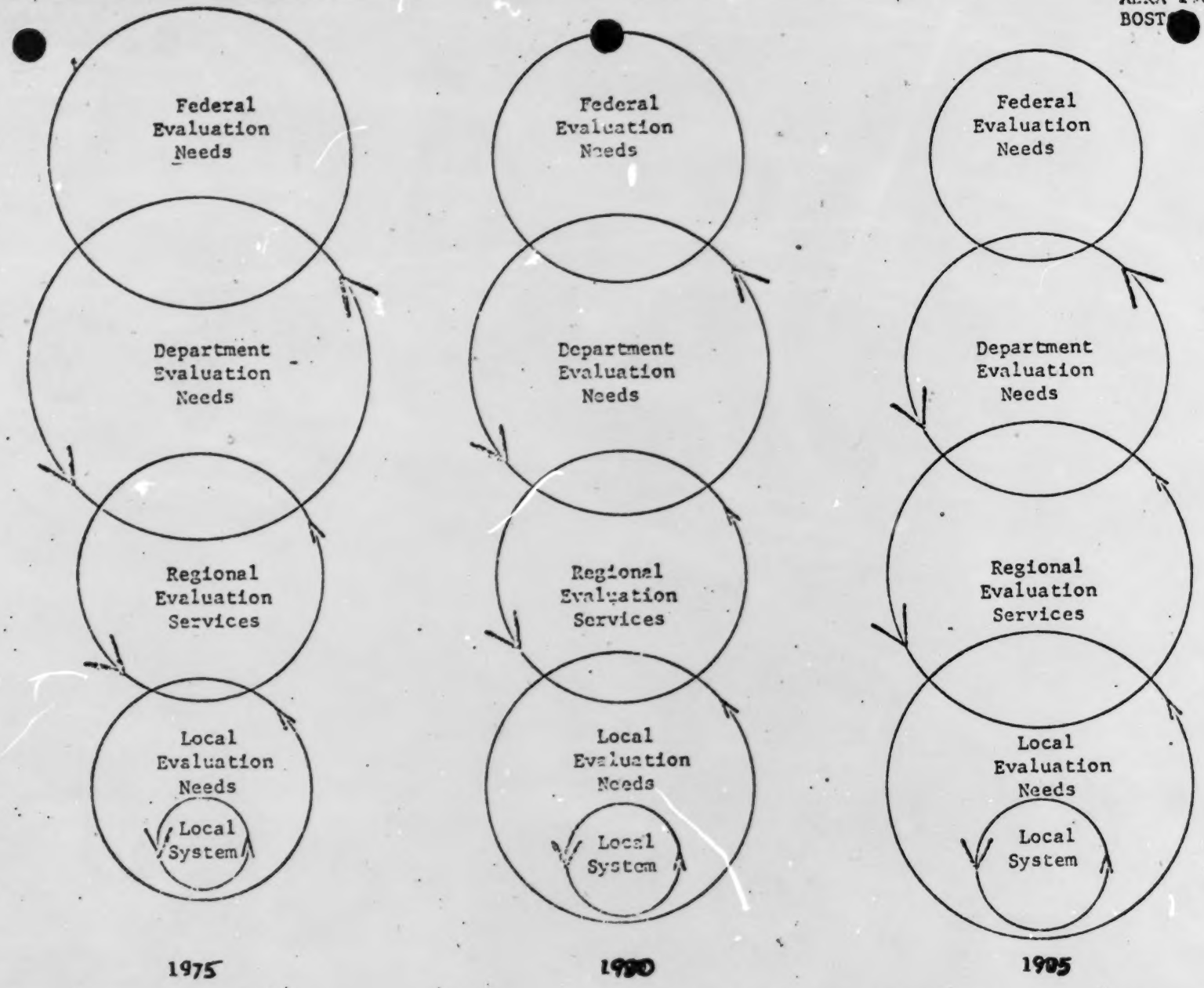


Figure 1. Relative importance Dept. places on evaluation & reporting in support of instruction.

THE EFFECTS OF AN INSTRUCTIONAL MANAGEMENT INFORMATION SYSTEM ON EDUCATION - PRELIMINARY FINDINGS

by

Charles F. Adams
Onondaga Madison BOCES
Syracuse, New York

Prepared for
Paper Presentation
on
SIG/System Research

Conducted by
American Educational Research Association
Boston, Massachusettes

April 11, 1980

Introduction

Although Project IMPACT has been in the state of development for three and a half years, its implementation at the classroom level has occurred during this past year only. A system of the scope and complexity of IMPACT has required an extended amount of time in the planning, design and testing phases. The development team, including the advisory committees, has operated from the premis that adequate planning and testing of a new system were essential prior to actual pilot testing in the "real world" setting. Therefore, components of the system were provided for use by school personnel only after extensive testing and "de-bugging" had occurred.

After each module or component of the system was completed to the satisfaction of the development team it was then made available for use by local school personnel. The first component of the system to be completed was the Norm Referenced Test Scoring Module (NRT). For the past three years this component has been used to score standardized commercial tests, both abilities tests and achievement tests for the school districts in Central New York. During this current school year, 1979-1980, norm referenced tests have been scored for over 30 school districts.

The second component of the IMPACT system to be field tested was the set of Prescriptive Activities in Reading (PAR). These teacher developed teaching-learning activities were first used by approximately twenty classroom teachers with students two years ago. The PAR banks existed in paper form only and teachers selected from their PAR manual those activities they judged to be appropriate for use with their students.

Last year the PAR banks were computerized and became a component of the Master Curriculum file. The prescriptions were cross-coded to instructional objectives as were criterion referenced measurement items. Presently, this computer based curriculum library (MCF) contains curricular elements (objectives, measurement items and prescriptions) for reading, mathematics and special education skill areas. This module is operational and is being used by five school districts to assist in developing local curricula.

The third component of the system to be completed to the stage of actual field testing was the Criterion Referenced Test Scoring Module (CRT). This current school year is the first full year of implementation of this component in classrooms in local school districts. Presently 43 local courses have been set up to use the CRT module for pupil and program monitoring. However, teachers of these courses have been following a diagnostic/prescriptive approach to instruction using an objectives based curriculum for the past two to three years. It is only recently that they have been utilizing the IMPACT Criterion Referenced Testing Module as an instructional management system.

The fourth major component of the system to be developed and field tested was the Student Achievement Historical File (SAHF). This module is not completely developed yet, but a three year history base of norm referenced test score data has been loaded into the file. The first actual test of the utility of this component will occur at the end of this school year when pre-post evaluation reports for students in categorically aided programs (e.g. Title I, ESEA) are produced for state and federal reporting purposes.

Thus, despite a significant amount of development work completed and major field testing of the components is underway, there is a paucity of emperical data extending over sufficient time to warrent any definitive conclusions as to the effacacy of the system in its entirety. This paper will posit some tentative findings, however, based upon formative assessments from available data from the pilot test sites.

Procedures

This assessment of Project IMPACT could best be characterized as a formative evaluation (Scrievn, 1967) as broadly interpreted by Bloom (1971). The project team has been and is continuing to collect information on the utility of the system, primarily for system revision and enhancement purposes. The ultimate aim, of course, is to provide a management information support system that will improve educational decision making and thus the achievement of students. However, sufficient implementation of the system in terms of length of time and extent of use has not yet occurred which would provide the basis for a summative evaluation from which judgements can be made.

Data collection procedures employed for these preliminary findings were of two types, judgmental data from both users and operators of the system and available student achievement data maintained in the system files. At the end of each development year, those teachers and administrators participating in the pilot testing of various components of the system were surveyed for their assessment of the component they were using. The results of these surveys are found in Tables I through 6.

Both norm referenced and criterion referenced achievement scores for students are maintained in the IMPACT course files and student achievement history files. Two school districts that have been pilots for the CRT Module of the system for the past two years were selected as a representative sample for this formative assessment. The student achievement data for those students enrolled in the pilot courses were summarized and analyzed and the results are listed in Table 7.

No statistical tests were applied to the survey data from school district personnel. Rather, frequency tabulations and percentage calculations of responses were the primary data analysis techniques employed. Only face validity is claimed for the survey instruments since no validation procedure was employed. A representative group of pilot district users did react to a draft version of the surveys and provided suggestions for clarity of wording and response recording.

The student achievement data analyzed was that obtained from the regular monitoring of student progress via the CRT module. Achievement data on those students who have been in the IMPACT pilot classrooms in the two sample school districts during this school year were analyzed to assess gain. The average gain in the number of instructional objectives mastered from Setpember 1, 1979 to March 1, 1980 was calculated for each student and summed by grade level and course. An arbitrary criterion of expectation was established based on the percentage of the school year completed as of March 1, 1980. Seventy percent of the school year has been completed, thus the expectancy mastery level was set at 70 percent of the set of course objectives. Table 7 displays the actual student mastery levels compared to the average expectation level chosen.

No inferential statistics were employed in the analysis of the mastery achievement data. Only descriptive statistics, which were deemed appropriate enough for a formative assessment, were used.

A complete set of pre and post norm referenced test scores was not available for all the students in the selected sample. Therefore, no achievement gains were able to be determined using norm referenced data.

Two criteria are generally applied to computer application systems to assess their effectiveness as computer support systems. They are timeliness of data processing and reporting and accuracy of results. A log of every set of student tests results sent to the computer center for scoring and analysis from local school districts was maintained from September 1979 on. The summary of the actual processing time for these tests is found in Table 8. This "turn around time" assessment is used to determine the timeliness of the processing system.

Accuracy is determined by the number of complaints by school districts relative to the results and the number of test scoring reports that had to be rerun due to errors. This accuracy assessment data is contained in Table 9. This data was obtained from complaints received at the computer center from local school district personnel.

In late February, 1980 those teachers using the CRT component of IMPACT were surveyed to obtain an interum assessment of the module. Results on items related to the computer support aspects of the system are reported in Table 6.

Table I

Teacher Ratings of Perscriptive Activities in Reading

ITEM	Frequency of Responses EXCELLENT	GOOD	ADEQUATE	POOR	UNSATISFACTORY	TOTAL
1. Availability of Prescriptive Activities in Reading (PAR)	8	9	3	0	0	20
2. Value of PAR in Program Planning	7	10	2	2	0	21
3. Value of PAR for student enrichment activities	14	5	2	0	0	21
4. Value of PAR for student remedial activities	15	5	1	0	0	21
5. Value of PAR materials as an alternative to regular instructional program	6	5	5	2	0	18
6. Training in the use of PAR Materials	3	6	5	3	1	18
7. Instructions for use of PAR	5	12	4	0	0	21
8. The organization of the PAR bank	9	7	3	1	0	20
TOTALS	67	59	25	8	1	

Table 2

Teacher Assessment of Individual Prescriptive Activities in Reading

1976 - 1977

RATING	NUMBER OF PAR ACTIVITIES RATED
Excellent	107
Good	137
Average	28
Fair	10
Poor	6
Total	288

Table 3

Percent of all Teacher Ratings of the Perscriptive Activities in Reading

1976 - 1977

VALUE RANGE	PERECNT OF RATINGS
Excellent (90% +)	37
Good (70 - 89%)	48
Average (50 - 69%)	10
Fair (30 - 49%)	3
Poor (0 - 29%)	2
Total	100

Table 4

Teacher Effectiveness Ratings of Prescriptive Activities in Reading

1977 - 1978

SKILL ACTIVITY AREAS	TOTAL NUMBER OF STUDENT ASSIGNMENTS	NUMBER OF STUDENTS MASTERING THE SKILL	NUMBER OF STUDENTS FAILING TO MASTER SKILL	PERCENT STUDENTS MASTERING
Comprehension	1005	941	64	94%
Phonetic Analysis	683	615	68	90%
Readiness	597	561	36	94%
Structural Analysis	1024	954	70	93%
Study Skills	323	313	10	97%
Vocabulary	1441	1389	52	96%
Totals	5073*	4773	300	94%

* These were 554 different PAR used by these student assignments

Table 5

Teacher Effectiveness Ratings of Prescriptive Activities in Reading

1978 - 1979

SKILL ACTIVITY AREAS	TOTAL NUMBER OF STUDENT ASSIGNMENTS	NUMBER OF STUDENTS MASTERING THE SKILL	NUMBER OF STUDENTS FAILING TO MASTER SKILL	PERCENT STUDENTS MASTERING
Readiness	311	310	1	99%
Phonetic Analysis	288	252	36	88%
Structural Analysis	1026	939	87	92%
Vocabulary	610	594	16	97%
Comprehension	689	622	67	90%
Reading in the Content areas	96	92	4	96%
Study Skills	69	63	6	91%
Totals	3089*	2872	217	93

*294 different PAR were used for these student assignments

Table 6

Teacher Assessment of the Computer Support Aspects of the IMPACT Criterion Referenced Module - 1980

ITEM	RESPONSE CATEGORIES	FREQUENCY AND % RESPONSE
1. The computer coding forms used were _____.	a. easy to understand and complete	7 (27%)
	b. satisfactory	17 (65%)
	c. complicated and difficult to complete	2 (8%)
	d. no opinion	0 (0%)
2. Instructions on Completing the coding forms was _____.	a. thorough and complete	7 (27%)
	b. satisfactory	18 (69%)
	c. unclear and hard to understand	1 (4%)
	d. no opinion	0 (0%)
3. The output reports from the Computer Center were _____.	a. always on time	10 (37%)
	b. generally on time	12 (44%)
	c. usually late	1 (4%)
	d. did not receive any reports	4 (15%)
4. The IMPACT output reports provided - information to make decisions regarding student performance.	a. excellent	9 (35%)
	b. good	10 (38%)
	c. fair	3 (12%)
	d. poor	0 (0%)
	e. no opinion	4 (15%)
5. The IMPACT output reports provided - pnformation to make decisions regarding program content	a. excellent	7 (27%)
	b. good	11 (43%)
	c. fair	4 (15%)
	d. poor	0 (0%)
	e. no opinion	4 (15%)

Table 7

Student Achievement Results

Reading Skill Mastery Gain by Course and Level

GRADE LEVEL	NUMBER OF COURSES	NUMBER OF STUDENT ENROLLED	AVERAGE PERCENTAGE OF OBJECTIVES MASTERED	NUMBER OF STUDENTS MASTERING 70% OR MORE OF OBJECTIVES MARCH 1, 1980
2	2	92	66.1%	27
3	1	22	75.5%	16
4	1	24	54%	5
5	1	11	83.6%	8
6	1	88	72.5%	40
Secondary Remedial	1	43	67.9%	21
Secondary Content Area (Social St.)	1	12	74.29%	8
Totals	8	292	69%	125

Table 8

Processing of School Districts Norm-Referenced Tests by IMPACT System

1979 - 1980

NUMBER OF DISTRICTS	TEST SCORED	AVERAGE TURNAROUND TIME	LONGEST TURNAROUND	SHORTEST TURNAROUND
4	California A. T.	12 days	22	6
4	Stamford A. T.	18 days	60	2
37	Pupil Eval. Program Tests	10 days	35	2
32	Reg. Comp. Tests	4 days	12	1
1	Iowa Test B.S.	10 days	10	10
10	Diff. Apt. Test	4 days	9	1
11	Otis-Lennon I.Q.	6 days	20	1
5	Loge Thorndike	4 days	7	2
1	Calf. T.M.M.	5 days	5	5
TOTAL		7 days	60	1

Table 9

Problem Reported on the Accuracy of Test Scoring and Analysis

Both NRT and CRT

PROBLEM	FREQUENCY REPORTED	CORRECTIVE ACTION
Incorrect Score results	2	Corrected scan tape program Corrected District supplied answer key for a CRT
Incorrect answer sheet (wrong number of answer bubbles)	1	Redesigned Scanning Program to overcome error on preprinted answer sheets
Incorrect norm scores reported for off level testing	1	Redesigned and reprogrammed the score conversion program of the NRT to accommodate off level testing.

Tentative Findings

A. Prescriptive Activities in Reading

Although over 1200 teaching learning prescriptions were developed by teachers in the pilot program, only about 30 percent of them have ever been used in the pilot classrooms. Of those that were chosen for use, they were rated very highly by the teachers who used them. The teachers also indicated that when they were used they contributed to student mastery of the skills they were intended to instruct in the vast majority of the cases (over 90%, see Tables 4 and 5).

Teachers found the use of the PAR's very helpful in planning instructional activities for students, especially those who had failed to master the skill and were in need of remedial work. Also, they were positive about the way the materials were organized and the instructions they received for their use.

It may be that the teacher judgement of the effectiveness of the PAR's is a true indicator of their utility. However, currently there is no corroborative emperical evidence to substantiate their judgement. In future years, with full use of the IMPACT system, emperical data will be collected and maintained on each PAR. An alternative explanation of the findings is that the teachers selected only those PAR's for use with students with which they had previously had success. By selecting only those prescriptions they judged to be most likely to be effective with their students they might have a built-in predisposition to judge their effectiveness highly. Most of us are reluctant to assess our professional judgement as frequently erroneous.

B. Student Achievement

The preliminary findings regarding the effects of the instructional management system on student achievement are based upon the data summarized in Tables 5 and 7. Student gains in skill mastery for 292 students in eight course in the two selected pilot districts' indicate that their achievment is just about at the expectation level, 70% of the objectives mastered. The average percent of the objectives mastered by March 1 was 69%. Approximately 43% of the students have exceeded the expectancy level. At that rate of growth it is very likely that the great majority of the students will master over 80% of the course objectives set for them by the end of the school year.

Teachers spent time during the summer selecting the appropriate objectives for the students in their courses as well as the criterion referenced measurement items to be used on their mastery tests. The availability of curriculum elements in the MCF was very expeditious in this curriculum specification process.

Since the teachers selected the objectives for instruction, it is possible that they either overestimated the difficulty level of the objectives or underestimated the capability of the students they were to teach this year. If this was the case, a lot more students would have demonstrated mastery of a greater percentage of the objectives by this time in the school year than the data seems to indicate. Teacher judgemental data found in Table 5 although subject to the usual reservations, supports the main contention of this project. That is, that when provided with specific achievement data on student progress on course

objectives at periodic intervals, teachers instructional decision making will be more appropriate and thus student learning enhanced. Nineteen of the twenty-three teachers responding to the survey who used the information for instructional decision making regarding students, rated the information they received either good or excellent.

C. Computer System Efficiency

The computer support system appears to be operating to the satisfaction of those using it. The data in Tables 6, 8 and 9 indicate there were few problems with the accuracy or timeliness of processing student test results. In a few cases there was some delay in processing norm referenced tests, most of which was due to unusual requests. One example problem was the testing of students over two years below normal level for age and grade. There were no publisher norms tables for this situation and it took some reprogramming to resolve.

For the criterion referenced tests, the data is processed and output results returned to the teachers in 24 to 48 hours. Rarely has the turnaround time been three days. Considering the large volume of tests being scored, the few cases of errors requiring re-processing indicates a high level of accuracy. Thus, the tentative conclusion is that the computer system itself, although still being refined, is an efficient and effective one.

Reference

Bloom, Benjamin S., Hastings, Thomas J. and Madams, George T. (ed.) Handbook on Formative and Summative Evaluation of Student Learning. New York: McGraw-Hill, 1971.

Sciver, Michael. The Methodology of Evaluation. AERA Monograph Series on Curriculum Evaluation. No. 1, pp. 39 - 83, 1967.